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## **FOREWORD**

### **User Responsibilities**

When you are going to install, operate, maintain and repair, you should make the product according to the description, attached logo and insert instructions. The product should be checked regularly and the defective one should not be used. The damaged, missing, excessively worn, transmutative or contaminated parts should be replaced immediately. When the product needs to be repaired or replaced parts, please e-mail or call to your supplier or our company and we will provide technical support to you sincerely. No one can make any changes to our products without the written permission of our company. Users should undertake all responsibilities when using and repairing incorrectly.

### **Announcement :**

-  The instrument must be operated by professional medical personnel.
-  Please read the instructions in detail before using the product.
-  Be aware of explosion hazard and do not use near flammable anesthetics.
-  Protective earthing
-  Type I Device
-  Type B Device

## I. Overview

Type MSM-02 Medical Suction Machine adopts secondary overflow protection device , the characteristics of strong and fast absorption, low noise , large volume , etc. Absorb the patient's purulent sputum, pure blood, mucus etc. quickly. Reduce emergency patient pain obstruction sputum that plays a role out of danger. MSM-02 is suitable for use in the operating room. They are ideal medical equipment in medical unit operations, family emergencies, and nursing. (Not suitable for abortion suction)

- Scope of application: Used for vacuum absorption of pus, blood, phlegm and other conditions in medical units.
- The equipment is not suitable for use in the case of flammable and explosive gases.
- Disinfection or sterilization method: Perform with appropriate way to the recommended company or other conventional methods.
- Working time: continuous duty of intermittent loading, the longest continuous working time is 30 minutes, continuous rate is 50%.
- Electrical requirements: Type II Type-B equipment

## II. Structural characteristics and working principles

### Characteristics of the Suction Device structure

■ Main structure: Medical Electric Suction Equipment is mainly composed of suction pump , reservoir, main engine, filter, vacuum gauge, foot switch, etc.

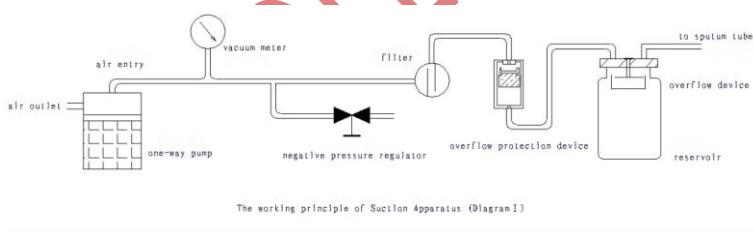
■ Adopt oil-free plunger pump as negative pressure source without oil mist pollution.

Running a pressure system will not produce positive pressure; they can be used safely and reliably.

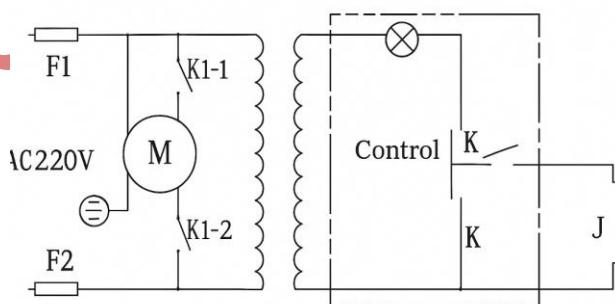
■ The negative pressure control system can be adjusted according to clinical needs.

■ New plastic shell, the reservoir adopts transparent polycarbonate (PC) material, with compact structure and simple operation.

### Working principle of MSM-02

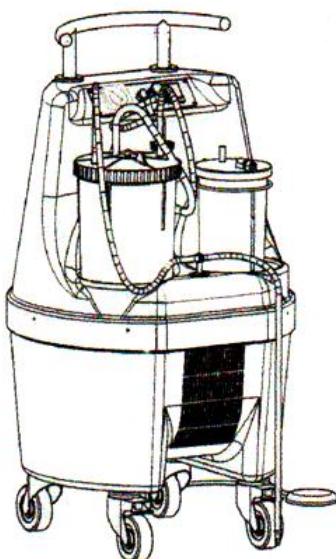


### Principle of Electricity MSM-02



### III. Technical Specifications

Input Power	: 230VA
Power Source	: AC220V/110V, 50-60Hz
The Maximum Negative Pressure Valve	: -0.09MPa
Negative Pressure	: -0.02MPa ~ Limited negative pressure valve
Pumping Rate	: 30L/min
Noise	: ≤55dB ( A )
Container	: 3500ml x 2



## IV. Open package inspection

Users should check before installing and debugging the product:

- Whether appearance the product Good or No
  - Whether the type and quantity of accessories match the accessory list or not
  - Accompanying documents consist of manuals, certificates
- ⚠** Please contact with supplier or factory in time if the product is in stock.  
**⚠** C defect or deficiency.

## V. Installation & Debugging

**Connect the current (see diagram 3 Pipe connection scheme, do not connect to the abdominal cavity tube)**

**Notice 1**

*Please apply a little distilled water to the press-in bottle opening of the bottle stopper before installing which supports the compaction of the bottle stopper and strengthens the tightness.*

**Notice 2**

*On the air filter there is a connection lied by some green dots is the air entrance. The connection must be connected to the outlet to the reservoir.*

**Notice 3**

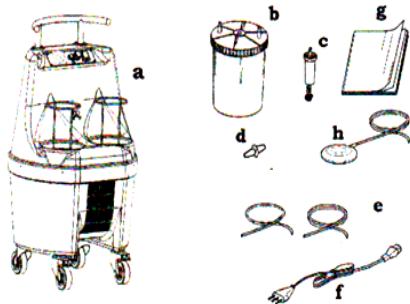
*Please check the Suction Apparatus according to the installation and debugging program before using it. Make sure its performance is good and connect it to the sterilized suction so that the ft pipe, then you can use it.*

CONTROL

# INSTRUCTIONS FOR USE

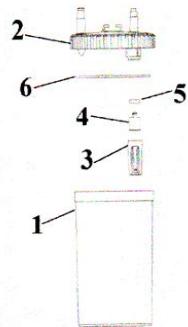
Following MSM- 02 package :

- a. Suction unit
- b. Liquid collection jar
- c. Additional safety valve
- d. Reduce connection from tube to sucking
- e. Pipe Connection from Jar
- f. Connecting pipes
- g. Power cable
- h. Instruction booklet
- i. Pedal control
- j. Rotating shock absorber arm



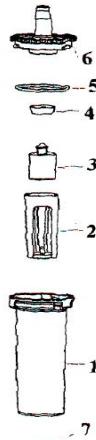
The container consists of:

- 1) Tiered Jar
- 2) Jar lid
- 3) Float holding
- 4) Floater
- 5) Valve gasket
- 6) Lid Pak



## Valves consist of:

- 1) Tube
- 2) Floater holder
- 3) Lifebuoy
- 4) Valve gasket
- 5) Valve cover gasket
- 6) Close the valve
- 7) gasket between threaded connection and
- 8) Valve Safety



## Turn on

- ⚠** Connect to the power supply, turn on the switch, the indicator light will light up indicating that the power is on and the machine will run.
- ⚠** Press the suction switch, the machine will run, the vacuum meter needle will rise rapidly until it reaches the limited negative pressure value, release the suction line, the meter needle will return to below 0.01 MPa. If this happens, it means the line is connected correctly.

The power disconnect device of this product is the plug attached.

The power socket must have reliable grounding.

## Pipe inspection

- Tighten the negative pressure regulator clockwise, close the airway with your finger or the rubber tip of the pipette, or fold and squeeze the soft suction tube.
- Press the suction switch, the machine will run, the vacuum meter needle will rise rapidly until it reaches the limited negative pressure value; release the suction line, the meter needle will return to below 0.01 MPa. If this happens, it indicates that the line has been connected correctly.

 Connect to the negative pressure sputum pipe negative system should be below 0.04 MPa, indicating that the condition of the suction pipe and sputum pipe is in good condition.

## Arrange negative pressure

Close the suction line, press the suction switch, and adjust the negative pressure regulator. The vacuum meter should change between 0.02 MPa and the limited negative pressure. When used in the clinic, the negative pressure regulator controls the negative value according to the suction needs.

 Press the regulator clockwise, the negative pressure will rise.

## Check and Test Overflow Protection Device

- Open the lid, clean the valve assembly to check the flotation device, the valve should be free from defects such as distortion, tearing, and connected with the flotation. The float in the flotation frame should be movable and flexible, without any blocked phenomenon.
- Connect the valve assembly and put it into the water, then the float will contact the water vertically. Slowly close the lid, the float should be able to float inside the flotation frame, and then the valve will block the air passage.
- Connect the reservoir, connect the soft suction pipe to the suction line, tighten the regulator, and run the suction tool.
- Insert the soft suction pipe into the bucket, or simulate the normal use situation, the liquid will be sucked into the reservoir by the overflow device. The increase in the liquid level will lift the float up until it closes the mouth valve, and the suction stops automatically. The final liquid level will change with different suction methods.
- Loosen the regulator, turn off the suction switch, open the bottle cap, and empty the reservoir. After re-capping tightly, the float should

be at the bottom of the flotation rack, and the mouth valve should be open.

The above is consistent with the overflow device, can be used clinically.

**⚠** When the overflow valve is turned off, if the liquid level continues to rise, there are two possibilities:

- 1 Caused by residual negative pressure in the reservoir
- 2 The mouth valve is not completely closed .

Previous situation, when the soft suction pipe leaves the liquid In the first situation, when the soft suction pipe leaves the sucked liquid and is extended, the liquid level in the reservoir will no longer increase. In the second situation, the liquid level continues to increase. Therefore, it should be carefully observed. When the reservoir is almost full, the soft suction pipe should be immediately pulled out of the sucked liquid. Turn off the suction device, stop sucking, and find the cause of the valve closing failure.

**⚠** After the float valve is turned off, the suction will stop. However, due to the negative pressure in the pipeline, the float may still be sucked into the mouth. At this time, you should release the regulator or turn off the suction device to release the negative pressure in the pipeline, and let the float fall according to its weight. It is strictly forbidden to pull the float by hand, so as to prevent the rubber valve from falling off the float.

**⚠** Turn off, release negative pressure before opening the cork

In case of removal of overflow devices and pipelines, suction tools are strictly prohibited to be used.

## Closing

After installation setup or use, turn off the suction switch first, then unplug the power plug from the power socket to disconnect the network power supply.

## VI. Instructions for use , maintenance and things to note

### Usage (Used by medical professionals)

- Before use, check the suction device according to the installation and adjustment procedures, make sure its performance is in good condition. Then, connect the sterilized soft suction hose and abdominal tube, and the device can be used. Before use, please note that the pressure should not exceed the specified pressure.
- During use, the pressure regulator can be used to adjust the negative pressure as needed, and periodically monitor the liquid level. Stop suction when the liquid level reaches the capacity limit marked on the reservoir. (This also applies to the entire machine with a slope of less than 10 degrees). The device can be reused after the reservoir has been emptied and cleaned. Otherwise, the liquid level will push the float up until it closes the valve and automatically stops the suction process. If there is active pressure during the suction process, the device must be turned off immediately.

 This suction device should be used under the guidance of professional medical personnel and strictly follow the operating procedures listed in the instructions for use. If you have any questions, please contact the supplier or manufacturer.

### Replace the air filter

If the air filter is filled with foam or dust, the color of the filter membrane will turn brown and the suction power at the pipe inlet will decrease, or even disappear completely. The negative pressure

on the vacuum pressure gauge will continue to increase until it exceeds 0.04 MPa. You must replace the air filter with a new one provided by the manufacturer.

**⚠** If the overflow device is closed, blockage in the pipe can also cause a decrease or loss of suction power, as well as an increase in the negative pressure value. (See the section "Damage Analysis and Response")

**⚠** Air filters must be replaced frequently and thoroughly cleaned.

## **Replace the fuse**

The network power fuse is installed on the crate board. You must disconnect the power supply first when replacing the fuse. Open the fuse tube cover by turning it, then replace it with a fuse tube that has the same specifications.

**⚠** Fuse replacement must be performed by authorized personnel.

## **Maintenance**

- Please suck a small amount of clean water into the suction pipe to clean the inside of the pipe before turning off the machine.
- Empty the collection container, then clean the dirt on the lid using a soft brush, then wash the container with clean water, including the spill protection device and all types of pipes. If necessary, open the spill protection device, separate its components (the valve seat and float frame are connected by a three-pin lock system), and remove the guide pipe for thorough cleaning.
- After using the sputum suction tube, clean the mucus and viscous fluid remaining in the tube using physiological saline solution. If the sputum suction tube is blocked or not smooth, it should be replaced. It is recommended to use a disposable sputum suction tube.

- The container, cover, and pipe can be soaked in disinfectant liquid (0.5 g per tablet) at a ratio of 1:500 for one hour.
- The surface of the machine should be cleaned with a small cloth moistened with disinfectant liquid, avoiding the liquid from seeping into the machine body.
- Maintenance of rotary vane type fuel pump (oil-free pump does not require maintenance).

Please place the machine in a dry and clean place when not in use. Turn on the machine periodically (once every six months).

-  Before the machine is used again, connect the overflow device, guide pipe and all pipes according to the line connection method.

## Symbols and their meaning regarding equipment safety requirements

Symbol	Meaning
~	air conditioning
I	Type I equipment
◐	Type B equipment
⚠	Notice: see accompanying documents
⏚	Protective earthing
○	Power off (total power)

## VII. Failure and exception analysis

NO	Damage	Cause Analysis	Step repair	Notes
1	Negative pressure value < negative pressure limit value	1) Leaking bottle mouth 2) Leaking regulator 3) Leaking pipe connection	1) Key closing 2) Tighten the regulator 3) Check pipe connection	1) Dirt on the bottle 2) Replace the suction pipe soft if damaged
2	Negative pressure value $\geq$ 0.04 MPa However, the suction at the pipe mouth is significantly reduced or completely lost.	1) Overflow device is turned off 2) Blockage pipeline 3) Blockage device safety	1) Loosen the regulator, remove it pressure negative in pipeline , then tighten up return  2) Clean or replace soft pipe or suction pipe soft  3) Contact manufacturer	1) Empty receptacle container in a way appropriate time  2) Contact manufacturer

3	The power is on, the switches are turned on, but the equipment is not working.	1) Loose socket 2) Melting fiber tube fuse	1) Maintenance or change socket  2) Replace fuse tube fiber melt	Replace according to specifications of the melt blown fiber tube fuse
4	Fiber tube fuse melts	1) Overload 2) Internal channel error	Check the power lines	Treatment by professionals

**⚠** Notice: If damaged, the product should be handled and serviced by professional technicians , please contact the manufacturer if required.

## VIII. Normal working conditions

- Ambient temperature : 5 ~ 40 °C
- Relative humidity : ≤80%
- Atmospheric pressure : 860 ~ 1060hPa

## Shipping environmental constraints transportation

- Ambient temperature : -40 ~ 55 °C
- Relative humidity : ≤ 95%
- Atmospheric pressure : 500 ~ 1060hPa

 Special storage conditions, method of packaging devices.

Should be preserved at temperatures between -10 °C ~ 40 °C, the relative temperature should not exceed 90%, atmospheric pressure is 860hPa ~ 1060 hPa in non-corrosive gas and ventilated room.

 Suction Equipment should be placed in a non-corrosive gas environment and ventilated space; Please avoid

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# **MEDICAL SUCTION MACHINE**

## **MSM-02**

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